

Optical properties of $\text{CH}_3\text{NH}_3\text{PbI}_3$ single crystal

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Abstract

$\text{CH}_3\text{NH}_3\text{PbI}_3$ single crystals were successfully grown from HI solution by cooling method, and their structure were studied by X-ray diffraction. The E_g value of $\text{CH}_3\text{NH}_3\text{PbI}_3$ single crystal determined by transmission spectrum was 1.51eV. Low-temperature photoluminescence spectra of $\text{CH}_3\text{NH}_3\text{PbI}_3$ single crystal show that a phase transition occurs at 160K, the luminescence mechanism might be the intrinsic transition. And with the temperature rising, the “Varshni” trend is observed in $\text{CH}_3\text{NH}_3\text{PbI}_3$ single crystal, indicating the change of E_g with temperature. Additionally, the E_g value

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